DEC STD 002-1 Power Controller Units - General Requirements

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ABSTRACT: This standard provides internationally unified rules and guidelines for power controllers.

APPLICABILITY: This standard applies to all power controller units and to the power controller features of other units that have an integrated power controller.

STATUS: APPROVED 30-Jul-1991; use VTX SMC for current status.

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1 INTRODUCTION

1.1 PURPOSE

This standard contains rules and guidelines that make Digital products suitable for the worldwide marketplace by providing economical power controller units and power controller features in other products which can facilitate their worldwide use.

1.2 SCOPE

1.2.1 Applicability

This standard applies to discrete power controllers as well as to all power controller functions of a product, such as a power supply which includes power controller functions. Regulating ac or dc power, voltage changing, rectification, power-down logic, and so on, may be included in the same unit as the power controller provisions; however, these provisions are neither included nor governed by this standard.

All power controller units that begin release for production after the approval of this document must conform to the requirements herein. *DEC STD 066-2 Waivers to Digital Design Standards* defines the process for waivers for products in design to the requirements of this standard that are not mandated by regulatory authorities in various countries. As power controller units that meet this standard become available, old units that can be replaced by newly designed units will become obsolete for new design use, for continuing use in newly manufactured products of older designs, and for replacement use in the field. Appropriate ECOs are, of course, required.

NOTE

This document does not require or suggest the retrofit or purging of any unit to meet the specifications of this standard.

To the extent possible, this standard also applies to power controller features of any unit, whether designed by Digital or another company, that has an integrated, rather than a distinct, power controller unit.

1.3 RESPONSIBILITIES

1.3.1 Power Controller Designers

The mandatory provisions of this standard apply to all power controller designers, whether or not they are working in a group that normally designs power controllers.

A power controller designer who ECOs a power controller should, to the extent practical, upgrade old designs that will not be replaced in the near future with new designs to ensure that on-going production more nearly conforms to this standard. Some features, such as Safety Extra Low Voltage (SELV) insulation of the power controller bus, MUST be ECOed to meet external safety standards.

1.3.2 Equipment Designers

Designers of equipment using power controllers shall use power controllers that meet the requirements of this standard at the start of product design.

Where practical, when a new power controller that meets this standard is available and replaces one or more old models in a direct, drop-in fashion, the old power controllers will be obsoleted and replaced by the new one.

1.3.3 Manufacturing

Manufacturing planners shall not forecast the shipment of power controllers that are designated as "replaced by" other units on the EPLS system or similar systems. Manufacturing quality personnel are required to prevent the shipment of power controllers that are replaced by other units.

1.4 SUPERSEDED STANDARDS

This standard supersedes subheads 6.2.1 through 6.2.5 and subhead 6.2.7 of *DEC STD 123-0 Power Control Bus Standard*, Rev B. In addition, subhead 6.2.6 of DEC STD 123-0, Rev B needs to be revised according to *DEC STD 178-0 Digital Identification Marking Requirements - Introduction* and to the requirements for multilingual or nonlingual product markings in *DEC STD 064-0 Compliance with International Language Requirements* and *DEC STD 119-0 Digital Product Safety- Introduction and General Requirements*.

1.5 DEFINITIONS

1.5.1 Power Controller Units

A power controller unit (commonly called a power controller) accepts ac power of commercial voltage and frequency from a wall, floor, or bus-bar receptacle, or from an isolating transformer assembly. Ac power is accepted either with a (fixed) cord, a (detachable) cord set, or field wiring.

The functions of a power controller unit are:

a. To protect the equipment with a circuit breaker(s) or a set of fuses.

b. To distribute some or all of the supplied power with a suitable contactor (power relay).

c. To distribute the power to one or more outlets and/or terminal strips.

d. Transient suppression.

A power controller unit may include the following provisions:

a. Remote control from another unit

b. Under-voltage or over-voltage ac detection (This is only for slow voltage transitions.)

c. Correct phase rotation detection

d. Electromagnetic interference (EMI) control

2 REQUIREMENTS

2.1 POWER INPUT CONNECTION

The following requirements apply to the power input connection at the power controller:

a. An International Electrotechnical Commission (IEC 320) C14, C16, or C20 single-phase appliance inlet shall be used, when suitable. It is allowable for power controllers rated 100 volts or 120 volts, single-phase only, to use a NEMA 5-15P or NEMA 5-20P inlet for U.S.A., Canada, and Japan. The NEMA L5-30P is also acceptable in the U.S.A. and Canada only. Refer to *DEC STD 002-0 Ac Power Wiring, Safety Earth Grounding, Plugs and Receptacle Information and Requirements* for detailed current ratings.

b. If the above IEC or NEMA appliance inlets are not suitable, field-rewirable input terminals with captive screws or other nondetachable hardware, labeled with symbols only, shall be used. They must be in conformance with applicable VDE/IEC component safety regulations.

   The IEC 309, *Plugs, Socket-Outlets and Couplers for Industrial Purposes* connectors are acceptable for single-phase and multi-phase equipment. Ratings of 16, 32, 63, and 125 A (Series I) are available for international use while 20A, 30A, 60A, and 100A (Series II) are normally considered for North American use. IEC 309 connectors are not recommended for appliance inlets due to their cost and size.

c. When an IEC appliance inlet is used, no field-rewirable input terminals are required or recommended.

NOTE

For ground symbols, refer to *DEC STD 178-5 Marking Symbology* and to Digital purchase specification A-PS-3612680-00-0 *Label, Ground Symbol, Purchase Specification*.

d. Field-rewirable terminals shall be suitable for all countries Digital normally sells to where the power controller might be reasonably used. The creepage and clearance distances must be met, and field-rewirable terminals must be suitably protected. See *DEC STD 119-1 Digital Product Safety - Design Criteria*. If captive hardware is not used, metric thread sizes must be used.

e. The power input cable to the power controller shall be strain relieved if an appliance inlet is not used. The strain relief must accommodate the entire range of cables that can be used throughout the world and conform to international requirements for the particular power controller. Refer to DEC STD 002-0 for strain relief requirements.

f. Field-rewirable terminals must tolerate tightening without torque wrenches or other special tools. Due to the narrow specification limits of nut or terminal torque that cannot be met under usual field conditions, terminals on some present ac line filters are unsuitable as field-rewirable terminals.

g. Appliance inlets shall meet the requirements of DEC STD 002-0.

h. Labeling symbols shall meet the requirements of DEC STD 178 (all applicable sections). The labeling shall be as follows:

   The equipment input terminals to which the power cord conductors are connected shall be marked to indicate their function.

Terminals for the neutral wire shall be marked N.

For single-phase connections, the input line terminal shall be marked L.

For polyphase power controllers, use the symbols L1 (line 1), L2 (line 2), L3 (line 3), N (neutral).

The safety earth ground terminal to which the green/yellow wire in the main power cord is connected shall be marked by the symbol : DEC STD 178-5 Marking Symbology, symbol A5019.

All markings must be made visible, indelible, and placed close to the terminal. They shall not be placed on parts that might be removed in the process of making connections. Refer to *DEC STD 119-2 Digital Product Safety - Test Procedures* for durability requirements.

i. Nameplates shall be labeled according to *DEC STD 178-2 Digital Marking Requirements for Subassemblies: Field Replaceable Units (FRU) and Non-Field Replaceable Units* and *DEC STD 178-3 Digital Marking Requirements for Completed Products Intended to be Sold*.

2.2 POWER OUTPUT CONNECTORS (RECEPTACLES)

The following requirements apply to output connectors.

a. Use IEC 320, *Appliance Couplers for Household and Similar General Purposes*, appliance coupler receptacles of suitable rating, if they satisfy the interface requirements placed on the power controller by its applications. These receptacles are listed in DEC STD 002-0.

b. Use properly covered output terminal strips with adequate spacing.

c. Use other receptacles of suitable rating if IEC appliance coupler receptacles are not appropriate or if higher power or multi-phase receptacles are necessary to meet interface requirements. IEC 309 receptacles are preferred. See DEC STD 002-0.

d. Using NEMA 5-15R or NEMA 6-15R receptacles as power controller outlets for a new design is acceptable, but not recommended except for designs limited to the U.S. and Canada.

e. NEMA 5-20R and NEMA 6-20R receptacles are not acceptable for use in Canada without special application approval. They shall not be used in new designs.

f. Every earth grounding connection shall be made with a reliable connection means that is not intended for mechanical purposes.

For example, a bonding wire shall be provided from the earth grounding terminal of each receptacle mounted on sheet metal to a grounding stud. See DEC STD 119-1.

A receptacle mounted directly on a printed wiring board shall have a reliable mechanical connection to an earth grounding connection in addition to a reliable electrical connection. The mechanical connection might be accomplished by bending or swaging the end of the earth grounding terminal before soldering. The electrical connection is to be provided by the solder.

g. If a power controller variation has outputs of two or more voltages, the same receptacle shall not be used for different voltages.

2.3 ACCESS TO THE INTERIOR OF A POWER CONTROLLER

Because Digital power controllers are not intended for on-site field repair, observe the following requirements to access the interior of a power controller unit.

a. Each power controller shall require special tools to access any area with hazardous voltages. The tools shall not ordinarily be carried by Digital field service personnel. Tools such as tamperproof TORX or tamperproof Allen-head fasteners are considered to be tools not ordinarily carried by field service personnel.

   All maintenance and repairs must be performed at a Digital repair depot or at other qualified facilities.

b. The following notice or equivalent in 13 languages should be placed on power controllers.

   CAUTION

   NO SERVICEABLE PARTS - return to authorized repair depot.

   Translations are contained in DEC STD 178-7 Translations.

   This notice will ordinarily be placed on a surface not visible until the unit is removed from its mounting.

2.4 POWER AVAILABLE INDICATOR

The low-reliability "input power available" neon indicator traditionally used on Digital power controllers, is usually unnecessary since most power controllers present no external hazard.

Relampable indicators must not allow access to live electrical parts while being relamped. Screw-type indicator lamps shall not be used.

In many cases, equipment that the power controller is powering will indicate whether the power is on, either with a set of indicators that signal the various states of the equipment or an explicit "power on" indicator.

The "input power available" indicator is unnecessary when:

a. The power controller can be easily disconnected from the power source at the power controller

   and

b. The power controller unit cannot be disassembled with readily available tools.

An "input power available" indicator MUST be provided if either of the following conditions is present.

a. The power controller is equipped with either an input or output terminal strip or with some other means of connecting the input power that is not easily detachable.

b. The power controller unit can be disassembled with readily available tools.

A "power on" or "power available" indicator shall be chosen so there is a good probability that it will not fail during the expected life of the power controller. For example, if the indicator is normally on, the Mean Time Between Failure (MTBF) of the indicator should exceed 75,000 hours with a goal of 100,000 hours or more. Use a relampable indicator only if a 75,000-hour MTBF indicator cannot be obtained and if an indicator is specifically required.

An indicator does not have to be a lamp. The following are examples of indicators listed in order of preference.

a. An electromechanical indicator, usually involving a magnet.

b. A light-emitting diode (LED) indicator with suitable resistor and backward diode.

c. A long-life, nonrelampable neon indicator. (At the present time, the maximum average life is 25,000 hours for commercially available lamps.)

If none of the above is available, a relampable indicator that uses readily available lamps (bulbs) may be used. Screw-base bulbs may not be used.

When choosing an indicator, it is important to consider the discounted life-cycle cost of the indicator and its maintenance or replacement costs, as well as the replacement cost of the power controller, since the control is scrapped due to a lamp failure. Indicators cost from $0.50 to $10.00. To relamp an indicator with a replaceable bulb during a preventive maintenance call may cost $5.00. However, the cost may be in excess of $100.00 if the relamping is based on a customer complaint that requires immediate maintenance service. (Presumably Digital and the customer assumed that something else was wrong before the Digital service person got to the site.)

The price to replace a failed, nonrelampable indicator costs as much as the power controller plus the cost of installation, easily $500.00. It is, therefore, often advisable to invest $10.00 initially to prevent high costs later on.

2.5 GROUNDING

The inlet power cord that is connected to a power controller shall be considered the only source of the safety earth ground. Therefore, all wiring and connections to sheet metal for the purpose of safety earth ground shall meet the requirements of DEC STD 002-0 and DEC STD 119-1.

2.6 EMI FILTERING

Usually, a power controller is the equipment through which the input power passes. It is almost always necessary to provide an EMI filter at the point where the power enters the power controller, although a filter at the outlet is also a suitable alternative. The EMI filtering must be divided by design between the power controller and the unit to which it supplies power. In a power controller for a specific application, it may be less expensive to filter EMI out at its source, thus minimizing the filtering requirement in the power controller.

A power controller design containing a power controller bus feature must be tested in a system environment actually using the power controller bus, to ensure that the radiated EMI is within acceptable limits. EMI filtering shall be provided on the power controller bus as required by DEC STD 123-0.

The leakage current of any EMI filter, together with other leakage sources, must not exceed the maximum limits defined in DEC STD 119-1, subhead 7.4.

2.7 CONDUCTOR SIZE

The conductor inside a power controller shall be of an adequate size to handle the required current without a significant voltage drop at the maximum temperature encountered when the power controller is used within its specifications. The total voltage drop from all causes across a power controller should not exceed 1.0 volts rms maximum measured from line-to-neutral at the rated current for both (all) wires together. That is, the output line-to-neutral voltage shall not be less than the input line-to-neutral voltage minus 1 volt. This voltage drop shall be measured from the input terminals or inlet connector (see Figure 1) of the power controller to the output power terminals or connectors that are mounted on the power controller.

If no neutral is present, the output line-to-line voltage should not be less than the input line-to-line voltage minus 1.73 volts.

Figure 1: Typical Cord Set

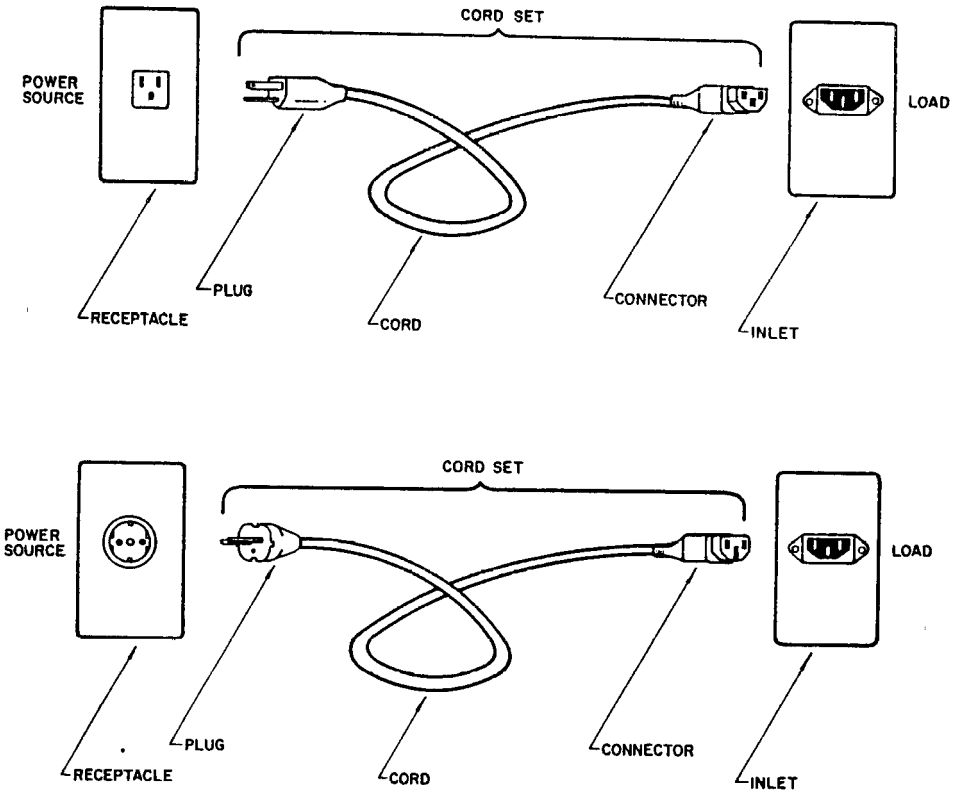

Table 1 shows the steady-state carrying capacity in amperes (ampacity) at nominal line voltage of a single copper conductor with 105°C insulation used WITHIN a power controller. Below 75°C, internal power controller ambient, no derating is required. Insulation must be rated for at least 300 volts.

Table 1: Ampacity of a Single Copper Conductor with 105 ° C Insulation

AWG	mm^2	Ampacity
18		10
	1.0	12
16		13
	1.5	15
14		18
	2.5	20
12		25
	4.0	28
10		30
	6.0	36
8		40
	10.0	50
6		55
	16.0	65
4		70
	25.0	85
2		95

NOTE

Use Table 1 in DEC STD 002-0 for flexible cords.

For short runs, three inches or less, the ampacity limits in Table 1 may be exceeded if proper design considerations are given to voltage drop and thermal aspects.

Consider the use of bus bars of copper sheets when a conductor is required to carry 40 amperes or more.

For copper bus bars, the current density should be limited to 1.55 amperes per square millimeter (1000 amperes per square inch).

Copper foil used in printed-wiring boards must have the same cross- section as indicated in Table 1. This will usually require heavier-than-normal copper foil (4 ounces rather than 1 or 2 ounces) and/or the copper foil be plated up to suitable thickness in copper. Solder or lead-tin coatings, if used, are not to be considered as a part of the conductor, in calculating cross-sectional area.

Aluminum or copper clad aluminum wire shall not be used.

Aluminum bus bars are not allowed, at this time. Future approval of the use of aluminum bus bars is contingent on proper design and manufacturing control documentation.

2.8 NEUTRAL CONDUCTOR

A neutral conductor, when present in the input connections, shall be carried through the EMI filter circuit, if present, and the circuit breaker, when required by subhead 2.11, to the output connections.

The neutral conductor in a 3-phase power system using single-phase non-linear loads will have neutral currents that cannot be eliminated by phase balancing. These loads can result in neutral currents as large as 1.73 times the rms line currents. That portion of the neutral circuit that carries the combined neutral current of two or three phases shall be sized to carry this current, including wiring to 2- and 3-phase connectors. In the absence of specific application data, the neutral conductor shall be sized to carry 1.5 times the rated phase current.

Note that the claimed neutral conductor may not be anywhere near the safety earth ground in voltage and shall be insulated as if it were a live voltage conductor. Note the requirements in subhead 2.11.

The name plate rating of the product must contain the information relative to the current requirements of the neutral conductor. Refer to DEC STD 178-3.

2.9 COLOR CODING

Color coding of wires inside the power controller shall be according to the specifications of the latest version of DEC STD 002-0.

2.10 CURRENT RATING

The nameplate current rating shall be at the nominal line voltage.

The power controller shall operate over the entire design range of voltages as specified in *DEC STD 122-0 AC Power Line Standard: Design Requirements and Guidelines*. The current drawn during some of these conditions will exceed the nameplate current rating. For example, for a resistive load, a voltage at the high end of the operating range will cause more current to be drawn than the nameplate rating; for a constant power load, a voltage at the low end of the operating range will cause more current to be drawn than the nameplate rating.

2.11 INPUT PROTECTION

A discrete power controller unit must contain input circuit protection in the form of a multipole circuit breaker that must be rated to interrupt 2000 amperes minimum under short circuit conditions. For input circuit breakers of 30 amperes and larger, higher interrupt capacity is generally required.

2.11.1 Single-Phase

On single-phase controllers, the input circuit breaker must break both input lines. All poles are to be current sensing.

2.11.2 2.11.2 Multi-Phase

The neutral conductor must be interrupted by the power disconnect means unless service personnel are not exposed to any open terminal of the neutral conductor. In practice, this means that a power controller that has accessible output terminals must open the neutral conductor with the input circuit breaker.

On any 3-phase power controller unit that does not have a detachable power cord (see subhead 2.1), the input circuit breaker also functions as a power disconnect means.

COMMENT

The power plug or the branch circuit panel circuit breaker AND the neutral terminal strip in the branch circuit panel are not always accessible to the Field Service personnel. Therefore, a disconnect means shall be provided in the equipment.

The circuit breaker pole in the neutral circuit is not required to sense current.

NOTE

In cases of significant third-harmonic loads, the neutral current may exceed any of the phase currents. In this case, the ampacity rating of the circuit breaker neutral pole and the neutral conductor must be rated accordingly. Refer to subhead 2.8 of this standard.

A multipole circuit breaker must be of the "common trip" design; that is, all poles must be opened when any one of the poles opens from any cause. It is recommended that multipole breakers be of " single handle internally interlock" design, and the neutral pole be located near the center of the assembly.

2.12 OUTPUT PROTECTION

Any output receptacle or terminal strip must be properly protected. If all loads are within the cabinet and a dedicated power controller is used, the output receptacles or terminal strips must be protected at not more than 2.5 times their rating. The input protection can serve this purpose if it is rated no more than 2.5 times the lowest output current rating. Configurations of this nature require additional cabinet-level testing for abnormal conditions, labeling, and other requirements, as described in DEC STD 119-1.

Free standing power controllers which are not intended to be mounted within cabinets and general purpose power controllers intended for cabinet mounting must have the output receptacles protected at their current ratings.

2.13 CONTACTOR RATING

The contactor shall have, as a minimum, an inductive load rating at the nominal voltage that is at least equal to the current rating of the input circuit protection device. See DEC STD 122-0 (Rev H) subhead 4.8 for requirements for inrush current.

2.14 VOLTAGE RATING

DEC STD 122-0 states that a power controller shall operate properly over the design voltage ranges and frequency ranges that correspond to the intended nominal voltage(s) and frequency range(s). Therefore, a power controller intended for both 208-volt and 240-volt operation, without adjustment, must operate properly on any voltage from 161 volts to 264 volts.

2.15 ENVIRONMENTAL CONDITIONS

DEC STD 102-0 Environmental Standard for Computers and Peripherals - General Test Requirements states that the environment of a power controller shall be assumed to be 10°C higher than the exterior environment of the cabinet in which the power controller is mounted. A power controller shall be assumed to have no free air above or below its location unless it is stated and emphasized in the power controller engineering specification that certain clearances are required above and below.

2.16 FREQUENCY SENSITIVITY

All components operating on power mains voltage in a power controller unit shall operate correctly at any line frequency within the range of 47 to 63 Hz.

2.17 RIDE THROUGH

A power controller shall maintain its operational condition for a period as long or longer than the power supplies of other equipment to which it supplies power.

Example:
If the connected load is intended to ride through a short-term power outage of 20 milliseconds, the power controller supplying the connected load shall operate properly for at least the same 20 millisecond outage; contacts shall not open later as a result of an interruption of 20 milliseconds; the power controller shall continue to operate properly after an input power interruption up to 20 milliseconds.

A power controller working properly shall not magnify or lengthen the power outage. (It is unresolved whether dc contactors are required to meet a 20 millisecond power outage or whether "real contactors" instead of large relays will perform appropriately. It is necessary to test an arrangement in a simulated or actual subsystem at the worst case configuration.)

2.18 POWER CONTROLLER BUS

The following requirements apply to the power controller bus:

a. The remote control connection shall meet the requirements of DEC STD 123-0. An exception is made if the power controller is required to interface with a power controller scheme that is specified by someone other than Digital.

b. The power controller bus defined in DEC STD 123-0 is a Safety Extra Low Voltage (SELV) circuit as described in DEC STD 119-0.

The power controller bus feature is not required in those cases where the power controller is never controlled by another unit or never controls another unit.

2.19 LISTING VERSUS RECOGNITION

In general, a power controller is UL "Recognized" and suitable for applications that must be investigated, rather than UL "Listed" for general use. If a power controller is investigated by an agency other than UL, the appropriate terms from that agency must be substituted in this statement.

A power controller that is not "Listed" is not intended for sale to end users except as a replacement in situations in which it has already been recognized.

2.20 TEMPERATURE DERATING

Unless otherwise stated in the engineering specification for a particular power controller, a power controller is usable for the full nameplate current at the maximum temperature for which the unit is designed.

CAUTION

A power controller that is specified to be derated is very likely to be misused by designers who do not read the engineering specification.

2.21 REMOTE-OFF-LOCAL SWITCH MARKING

The Remote-Off-Local switch shall be marked as follows:

a. Remote Position - See DEC STD 178-5, symbol D0093

b. Off Position - See DEC STD 178-5, symbol A5265.

c. On Position - See DEC STD 178-5, symbol A5264.

If there are any power controllers in which the local position does not directly turn on the unit but merely enables something else (for example, a console on-off switch) to turn on the unit, then additional investigation will be required.

2.22 POWER DISCONNECT (CIRCUIT BREAKER) MARKING

The power disconnect (circuit breaker) shall be marked as follows:

a. A circle in the OFF position. See DEC STD 178-5, symbol A5008.

b. A vertical line in the ON position. See DEC STD 178-5, symbol A5007.

2.23 OTHER LABELS

According to *DEC STD 064-0 Compliance With International Language Requirements*, labels on a power controller unit that are not language independent must be translated according to the countries to which Digital expects to ship equipment. At present, 13 languages are required unless a unit is restricted geographically. See DEC STD 178-3 for more information. Language-independent labels are preferred where possible. See DEC STD 178-5.

2.24 TRANSIENT PROTECTION

Power line protection metal oxide varistors (MOVs) shall be connected to each power line to neutral. In the case that neutral is not used, the connection is made from each power line to power line.

Table 2: Acceptable MOVs for Power Controller Use

Nominal VAC	Maximum AC Voltage (Continuous)	Voltage @ 1 mA DC (Vdc)	Size (dia.) mm	Test Voltage 8x20(μsec)	Peak Current 8x20(μsec)	Energy (Joules 10 X 1000)
100 - 120	140 Vrms (150 V for 1 s)	198 - 242	10	385V @ 50A	2500A	22
			14	370V @ 50A	4500A	42
			20	360V @ 100A	6500A	80
220 - 240	275 Vrms (300 V for 1 s)	387 - 473	10	770 V @ 50A	2500A	45
			14	710 V @ 50A	4500A	75
			20	710 V @ 100A	6500A	140

MOVs should be wired such that a total round trip lead length of less than 6.0 inches, and a loop area of less than 1.5 square inch is seen on any shunting connection path. The connection leads shall have the equivalent size of 18 AWG minimum.

See Purchase Specifications A-PS-1311996-00-0, *Varistor, Metal Oxide* and A-PS-1322505-00-0, *Varistors, Metal Oxide General Specification* for MOV characteristics. The number, size, and location of the MOVs shall be per Tables 3 and 4.

Table 3: Minimum MOV Diameters for Input Power Lines 20 Amperes and Less

Unswitched Outlets Present	Diameter	Location
Yes	10 mm	Load Side of Contactor
	AND	
	14 mm	Line Side of Contactor
No	14 mm	Load Side of Contactor

Table 4: Minimum MOV Diameters for Input Lines Over 20 Amperes

Unswitched Outlets Present	Diameter	Location
Yes	14 mm	Load Side of Contactor
	AND	
	20 mm	Line Side of Contactor
No	20 mm	Load Side of Contactor

APPENDIX A REFERENCED DOCUMENTS

A.1 EL-Class Digital Documents

EL-Class Number	Document Title
EL-00002-00	*DEC STD 002-0 AC Power Wiring, Safety Earth Grounding, Plugs and Receptacle Information and Requirements*
EL-00064-00	*DEC STD 064-0 Compliance with International Language Requirements*
EL-00066-02	*DEC STD 066-2 Waivers to Digital Design Standards*
EL-00102-00	*DEC STD 102-0 Environmental Standard for Computers and Peripherals - General Test Requirements*
EL-00119-00	*DEC STD 119-0 Digital Product Safety - Introduction and General Requirements*
EL-00119-01	*DEC STD 119-1 Digital Product Safety - Design Criteria*
EL-00119-02	*DEC STD 119-2 Digital Product Safety - Test Procedures*
EL-00122-00	*DEC STD 122-0 AC Power Line Standard: Design Requirements and Guidelines*
EL-00123-00	*DEC STD 123-0 Power Control Bus Standard*
EL-00178-00	*DEC STD 178-0 Digital Identification Marking Requirements - Introduction*
EL-00178-02	*DEC STD 178-2 Digital Marking Requirements for Subassemblies: Field Replaceable Units (FRU) and Non-Field Replaceable Units*
EL-00178-03	*DEC STD 178-3 Digital Marking Requirements for Completed Products Intended to Be Sold*
EL-00178-05	*DEC STD 178-5 Marking Symbology*
EL-00178-07	*DEC STD 178-7 Translations*

Use VTX SMC to order copies of EL-class documents from Standards and Methods Control. Send distribution questions to JOKUR::SMC or call DTN: 234-4423.

A.2 Other Digital Documents

Document Number	Document Title
APS1311996000000	*Varistor, Metal Oxide, Purchase Specification*
APS1322505000000	*Varistors, Metal Oxide, General Specification*
APS3612680000000	*Label, Ground Symbol, Purchase Specification*

A.3 Other Documents

Document Number	Document Title
IEC 309	*Plugs, Socket-Outlets, and Couplers for Industrial Purposes*
IEC 320	*Appliance Couplers for Household and Similar General Purposes*

A.4 Ordering Information

Purchase Specifications are available from any Microfilm Reference File (35 mm aperture card "tub") or the SPOC system.

Information about IEC documents can be obtained from Corporate Product Safety and Regulations (CPS & R), DTN: 223-7471.

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